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REPORT

ON THE

EXPERIMENTAL FARMS

IN THE

CENTRAL PROVINCES

FOR

THE YEAR 1904-05.

Ending 31st March 1905.

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No. 220.

FROM

C. E. LOW, ESQ., I. C. S.,

DIRECTOR OF AGRICULTURE,

Central Provinces

TO

THE CHIEF SECRETARY TO THE HON'BLE THE CHIEF COMMISSIONER, CENTRAL PROVINCES,

REVENUE DEPARTMENT.

Nagpur, the 29th August 1905.

SIR,

I have the honour to forward the reports on the Experimental Farms at Nagpur (including Telinkheri), Powarkhera and Labhandih for the year 1904-05. I regret the late submission of the report, which is due to the fact that I had to write it immediately on assuming charge of the new appointment of Director of Agriculture, with an incomplete staff and an office necessarily in some confusion.

2. As stated by my predecessor in last year's report it had been suggested that the detailed description of the various series of experiments should be omitted and replaced by a note of the more important results attained. These orders do not appear to have been communicated to the Farm Superintendent, as I understand my predecessor wished to have the advantage of a thorough discussion of the question of farm reports with Mr. Sly, the Officiating Inspector-General of Agriculture. However, the united length of the three farm reports had they been printed as received would have been so considerable that I judged it absolutely necessary to comply, as far as was possible in the very limited time at my disposal, with the above order; and I have accordingly tried to put the reports into a form more in consonance with the above suggestions. These series experiments might, I think, find a more appropriate place in the booklet which I am proposing to issue to visitors to the Nagpur Farm, while in the case of the other two farms a sufficient number of years has not yet elapsed to render the results of much value. It will be time enough to think of publishing booklets for visitors when the additions to these farms now proposed have been completed and put in working order.

3. The season was unfavourable to rice, especially in the Nagpur and Powarkhera farms, while the delay in completing the new Telinkheri pipe line in the one case and the wells in the other case resulted in the total failure of the rice crop. The year was not a bad one for cotton and juar; rice did better in the Chhattisgarh Farm than might have been expected, while the season was rather too dry for wheat sown in embanked fields.

4. *Improvements.*—Much remains to be done at Powarkhera in the way of levelling fields and preventing erosion, and until this work is completed uniform results cannot be looked for. The well at Labhandih has also not yet been finished. Otherwise the building programme at the two farms has been fairly well worked up to. The new Telinkheri pipe line is not in working order, nor have the two Dutch barns at Nagpur and Telinkheri yet been properly constructed. A good deal has been done incidentally, I am told, to improve the flow in the old pipe line.

5. The more important results on the Nagpur Farm may be summarised as follows:—

(*a*) *Series experiments.*—The superiority of saltpetre as a top-dressing in the case of irrigated crops to most other forms of manure was fully established.

(*b*) *Introduction of new varieties.*—The superiority of the awned variety of bajra was maintained and an effective demand from cultivators has arisen. A new species of juar for use as fodder has been procured from Poona: it promises well. The large-seeded Bilaspur variety of *tur* is believed to be unsuited for open field cultivation and is likely to do better as a garden crop. Dharwar tilli was found to deteriorate greatly when sown on the farm and by no means retain the high oil-bearing properties that had led us to attempt its introduction here.

(*c*) *Cultivation of varieties for seed distribution.*—The Saoneri variety of juari was distributed to several districts, where it proved a success. The Upland Georgian variety of cotton has been acclimatized on the farm during the last 10 years, and it was this year distributed in several districts in the Central Provinces and Berar, where it did fairly on the whole. There has been a considerable demand for the improved variety of ground-nut from several quarters.

(*d*) *Production of new varieties of cotton and wheat by hybridising.*—It is reported from two of the northern districts, though not with the precision that could have been wished, that the cross-bred wheat is not a rust-resistant there: if this is the case, it will be necessary to evolve a wheat which will withstand rust in the Nerbudda valley, if the cross-bred wheat is only rust-proof in Nagpur. Experiments in the crossing of cotton still continue.

(*e*) *Investigation of plant diseases.*—Extensive demonstrations are conducted in order to teach the cultivators of Berar and the western districts of the Central Provinces the advantages of the sulphate of copper treatment of juar, and it is believed that it is likely to catch on, especially in Berar. Two other fungicides were tried, but, owing to the absence of smut on the farm, without result.

(*f*) *Trial of implements.*—An Hoshangabad bakhar was tried this year which seems to possess certain points of superiority over the local one. The bullock-power cotton gin did well, getting through 500 lbs. kapas a day. Its sale will be pushed by a demonstration party next year. The farm obtained the award of a gold medal for its exhibit of implements at the Bombay exhibition.

6. The operations of the Telinkheri cattle-farm might, I think, be more fittingly described under the Veterinary Report another year. The number of cattle increased from 75 to 108. Colonel Morgan, the Inspector-General of the Civil Veterinary Department, who visited the farm, appears to have been favourably impressed with its management. Extensive use was made of ensilage to help the cases through the hot weather. Several animals were cast under Colonel Morgan's orders.

7. The Powarkhera Farm is not so advanced, so far as the actual cultivation goes, as the Labhandih Farm. Much still remains to be done in the way of levelling the fields. The most interesting results were obtained in respect of the embanked fields, where, in this year of light rainfall, the outturn was nearly double that of the unembanked fields. The Batchelor plough for the eradication of kans was experimented with and gave very good results. The number of cattle on the cattle-farm increased from 33 to 60.

8. The farm at Labhandih has already produced some most interesting experiments in rice cultivation. As was expected, transplanted rice was found

to do by far the best. The results of *biasi* came next: next to *biasi* came the *lehi* method (sowing by previous germination), and last of all unoperated rice, the yield of which was about half that of *biasi*. This last result corresponds with the popular idea on the subject. I am under the disadvantage of never having seen the farm and so cannot say if the *lehi* method has been practised in soil suitable to it. The result of sowing a second crop after rice with and without ploughing for a second crop were obscured by the dry year.

9. I am not in a position to say anything regarding the services of the different Farm Superintendents or of Mr. Joshi, the Assistant Director of Agriculture, but I understand they sustained the good impression they had produced on my predecessor in the previous year.

I have the honour to be,

Sir,

Your most obedient Servant,

C. E. LOW,

Director of Agriculture.

Report on the Nagpur and Telinkheri Experimental Farms for the year 1904-05.

No. 334, dated Nagpur, the 29th July 1905.

From - Mr. BHAYALAL DUBEY, L AGR., Superintendent, Government Experimental Farm, Nagpur,

To—The Director of Agriculture, Central Provinces.

I have the honour to submit the annual report for the year ending 31st March 1905 on the working of the Experimental Farms at Nagpur and Telinkheri.

I.—CHARACTER OF THE SEASON.

2. The following table compares the rainfall of the year as registered on the farm with the average of the preceding 30 years: —

Month.	No. of rainy days.	Rainfall.	Average of 30 years preceding.	Month.	No. of rainy days.	Rainfall.	Average of 30 years preceding.
		Inches.	Inches.			Inches.	Inches.
April ... 1st half ...	...	...	·18	October. 1st half ...	2	1·01	1·26
April ... 2nd half ...	...	...	·27	October. 2nd half ...	2	·77	1·18
May .. 1st half ...	...	...	·21	November. 1st half ...	...	...	·58
May .. 2nd half ...	2	·53	·30	November. 2nd half ...	...	...	·16
June ... 1st half ...	3	·97	2·59	December. 1st half ...	...	...	·14
June ... 2nd half ...	7	6·32	4·94	December. 2nd half ..	...	...	·24
July ... 1st half ...	4	3·90	6·64	January.. 1st half ..	..	...	·33
July ... 2nd half ...	3	·57	7·67	January.. 2nd half ...	...	·14	·18
August .. 1st half ...	5	4·50	6·59	February. 1st half ...	...	...	·18
August .. 2nd half ...	4	2·68	5·34	February. 2nd half ...	1	·7[illegible]	·25
September. 1st half ...	8	5·64	4·38	March ... 1st half ...	...	...	·23
September. 2nd half ...	1	·27	3·93	March ... 2nd half ...	1	·14	·19
				Total ...	43	28·19	47·96

NOTE.—A rainy day is taken as one on which there was a fall of not less than 10 cents.

3. The regular monsoon broke in the middle of June and the sowings of kharif crops were finished in due time. The germination of all the crops was good. But for want of sufficient rain in the latter half of July the juar seedlings were much damaged by squirrels and insect pests, the crop therefore had to be re-sown; and then, helped by well-distributed rain in the beginning of August, it continued to make good progress till the 10th. From this date up to the 27th August there was again a deficiency of rain and this was a very critical period for juar. It had already begun to wither when timely showers saved the crop and much improved its condition. The crop had again to pass through a trying stage from the middle of September up to the end of the first week of October, during which time the rainfall amounted only to ·27 inches. Afterwards the crop did well up to the end. The cotton crop being tap-rooted did not feel the other breaks much excepting the last one, which retarded its growth to some extent; but moderate rains in the second week of October much improved its condition, and the crop did well afterwards, finally yielding a handsome outturn of 700 lbs. per acre. During this break the Upland Georgian variety of cotton, which was sown on a larger scale this season, also suffered much from insect pests. The crop, however, yielded well in the end, though not what its condition in the beginning had promised. The tur crop grew well all through and being an early ripening variety it was safe from the frost, which destroyed the whole crop of the northern districts. It had already ripened when the exceptional cold set in. The maize crop in spite of the attack of borers induced by want of sufficient rain, yielded a good crop of nice cobs. The crop of bajra suffered very seriously from heavy showers at the time of flowering and produced thinly set heads.

4. The plots destined for rabi sowings had received constant bakharings in the rains and were already in a nice state of tilth at the time of sowing. The rainfall of 1·78 inches in October was particularly favourable to germination. Linseed, coriander and gram did well from beginning to end. Peas gave a bumper crop and wheat, notwithstanding the

absence of rains in November, December and January, gave an outturn of 745 lbs. per acre. This shows how much can be done for this crop by a thoroughly good tilth.

II.—RESULTS OF THE SEVERAL SERIES OF EXPERIMENTS IN DETAIL WITH COMMENTARY.

SERIES A. SUBJECT.—*Continuous manure experiments with irrigated wheat.*

5. The noteworthy features of the series this year were—(1) the superiority of the *kadujira* to *san* as a green manure, the results being as under:—

	Grain.	Straw.
	lbs.	lbs.
San	1,500	1,550
Kadujira	1,767	2,220

(2) the fact that the results of the previous two years' experiments were reversed in the case of the comparison of saltpetre used as a top-dressing and as an ordinary manure:—

	Grain.	Straw.
	lbs.	lbs.
Saltpetre top-dressing	1,650	1,640
Ordinary saltpetre	1,744	1,930

Generally speaking, the wheat outturn was excellent, owing to the heavy dewfall.

SERIES B. SUBJECT.—*Continuous manure experiments with dry-crop wheat.*

The comparison of the results of *kadujira* and *san* green soiling are even more marked here than in the irrigated series, the superiority shown by the former over the latter being in the proportion of 10:15. The results in the case of saltpetre are, as might be expected, the opposite of those in the irrigated plot, a top-dressing needing to be melted into the soil by water to have any effect.

SERIES C. SUBJECT.—*Effect of manure on irrigated and unirrigated wheat applied in June and in August.*

In the case of irrigated wheat the June manuring seems to be the least successful: but without irrigation the difference is not marked, being on the whole in favour of the manuring in the earlier month.

SERIES D. SUBJECT.—*Effect on cotton aud juar-tur (mixed) in rotation of various manures.*

Here the application of 40 lbs. nitrogen equivalent in the form of saltpetre as compared with half the amount in the form of a top-dressing gave 255 lbs. cotton lint as against 265 lbs. The advantage of the smaller amount is clear.

SERIES J. SUBJECT.—*Effect of manure on juar with subordinate crop tur continuously without rotation.*

The tur was found to be somewhat injured by the excessive luxuriance of the juar crop. Saltpetre drilled in continued to give inferior results to the same amount of saltpetre used as a top-dressing.

SERIES E. SUBJECT.—*Effect of tillage to various depths on irrigated wheat grown continuously.*

The result of ploughing and scarifying was as usual better than that of simple scarifying, but the Swedish plough did not maintain the advantage it had shown in the preceding two years.

SERIES I. SUBJECT.—*Rotation experiments with kharif crops.*

Here cotton and tur were found to continue to give superior results either to cotton as a single crop, or to cotton-juar, in which the juar overshadowed and choked the shorter cotton plants. None of the other series yielded results worthy of remark.

III.—VARIETIES OF CROPS.

6. The varieties of crops cultivated on the farm were the following:—

Bajra (*Pennisetum Typhoideum*).—The awned variety and the one received from Narsinghpur were tried. Both of them grew well, but at the time of flowering heavy showers affected the fertilization of the heads, and therefore the outturn was greatly reduced. The awned variety of bajra produces larger heads with larger and sweeter grains, and owing to the awned character of the head the birds cannot damage the crop to such an extent as they do the local varieties. It is particularly due to this character that it has begun to find favour with those cultivators, who have come to know about its advantages. For the last three years the seed was sent to districts where bajra is grown to a large extent and the general reports are fairly satisfactory. During the current season private demands from Berar have been supplied so far as the stock of seed allowed. This variety requires a careful selection of heads annually, otherwise it soon loses its awned character. The variety from Narsinghpur known as Allahabad bajra seems also to be promising. It has no awns but produces a good sized head with as good grain as the awned variety but more closely set.

7. *Sorghum* (*Amber and Collier*).—Both these have been found to be the best fodder crops. If sown as soon as the monsoon sets in they can be reaped early enough to give sufficient time to prepare the seed-bed for such crops as gram or teora, and, if the late rains are favourable, even for linseed. Two other varieties *sundhia* (variety of juar) and *nilwa* (another variety of juar) were obtained from the Government Farm, Poona. The former produces a very fine fodder with long thin stalks and becomes ready for fodder purposes as early as the sorghums. It can be substituted for them. But the *nilwa* variety was found to be as late as our late variety of juar. It is also not so good for fodder purposes as *sundhia* (variety of juar). The early varieties can be used for ensilage also, possessing plenty of bulk.

8. *Juar* (*Andropogon Sorghum*).—The varieties of juar usually grown on the farm are ganeri and halki (early). The variety Saoneri, selected the year before last from amongst the different varieties, occupied the most prominent area on the farm during the year under report. This variety surpasses both the ganeri and halki in yield and quality of grain. Besides these the trial of 100 varieties, some received from different districts and some received from the office of the Inspector-General of Agriculture, was continued in Field No. 53. Their agricultural characteristics have also been noted, and will appear in the bulletin on *Andropogon Sorghum* to be issued from the office of the Director of Agriculture.

Varieties of paddy (*Oryza sativa*).

9. In all 39 varieties of paddy were grown on the farm. Chinnor occupied a prominent area, while the others were only sown in trial plots 20′ × 20′. Owing to the season being very unfavourable to rice, the varieties in these plots did not produce enough seed to show their quality. During the current season the more promising varieties have been sent for cultivation on the Raipur Farm. The farm seed of the Chinnor variety was a little deteriorated by continuous growing on the same soil and in the same climate, and therefore fresh seed was obtained through the Deputy Commissioner, Balaghat, a district which is considered to be the home of Chinnor.

Cotton (*Gossypium*).

10. Different varieties of cotton from all parts of India and some American varieties, together with the crosses produced on the farm, were grown side by side. The crosses and recrosses obtained by artificial hybridisation during the year under report number 37. These will be sown in the current season and their peculiarities noted. A statement showing the characteristics of some crosses together with those of their parents have already been printed in last year's report. Next season the same peculiarities of the same crosses will again be noted to see if some or all of them have begun to revert to the original types. The fixed and more promising varieties will then be given a more extended trial. The American varieties did not do at all satisfactorily. They are not yet sufficiently acclimatized. Some seed has, however, been collected to continue them. The Bengal and Bombay late varieties are very vigorous and branch profusely, but they cannot be successfully grown in the soil of the farm without irrigation, as the bolls for want of moisture do not develop properly and burst only irregularly and incompletely.

The varieties more extensively sown on the farm are Jari, Bani, Nimari and Upland Georgian. Bani and Nimari are cultivated on the farm only for the sake of maintaining the varieties and they therefore occupy only about 2 acres. The Nagpur soil is not at all suited to their growth and they do not yield as much as jari does. The Upland Georgian had been under acclimatization for the last 10 years and now it does well enough to justify its introduction. During the year under report it occupied about three acres on the farm. The

seed obtained has been distributed in Nagpur, Wardha and some districts of Berar. Last year also some seed of this variety was distributed in Nagpur and Wardha. The reports from cultivators who have taken the trouble to cultivate it properly show that it pays as well as the local varieties. Mr. Raghoba Rati Ram, of Saoner in Nagpur District, has kept his own seed and is going to sow it on a larger scale during the current season.

11. *Maize—(Zea Mais)*.—The only variety grown was the Jaunpur kind. It flourished well and produced a bumper crop of big cobs sufficiently good for seed purposes. The seed has been distributed in some districts and to all district gardens.

12. *Tur (Cajanus Indicus)*.—Besides the local kind, the cultivation of a big-seeded variety from Bilaspur was also extended, but it did not thrive in fields for want of moisture. In well manured places with occasional watering it produces a very heavy outturn of big pods containing seeds as big as the English pea. It seems therefore to be much more a garden than a field crop : as a green vegetable like peas it forms a nice dish. The seed has been distributed to all district gardens and some small private demands were also supplied.

13. *Big-seeded Chauli (Vigna Catiang)*.—From amongst the varieties of chauli received from different places and tried last year, this variety was found to be the best. It grew as successfully as in other years. The seed has been distributed to all district gardens and to cultivators who wanted to try it.

14. *Ground-nut (Arachis Hypogæa)*.—This variety has better-filled pods, gives a better outturn, and is better flavoured than the local variety. For the last 2 years the seed has been distributed in the Katol Tahsil of Nagpur District and in Nimar. The reports from the latter place are promising. Nothing has been heard from Katol This year the seed has also been sent to Akola and to all district gardens. There was some demand from private persons also and this has been duly supplied.

15. *Surat Beans—(Dolichos Lab-lab)*.—This is a variety of what is called *wal* in the south and *sem* in the northern districts, which the Assistant Director of Agriculture had picked up at Surat while on tour in the Bombay Presidency. This variety is much more a garden than a field crop. It is a climber and spreads most profusely upon the branching supports fixed for it. It begins to produce an abundant crop of white pods about 2″ long containing 3 or 4 seeds, and if helped by watering continues to flower and yield till April. The pods are used as green vegetables. The seed of the variety has been sent to all district gardens.

16. *Lima Beans (Phaseolus lunatus)*.—The seed of these was obtained from a firm in England. Its habit of growth, pods, and seeds are just like those of double beans, and it is used in the same way. The seeds, however, seem a little better flavoured than those of double beans. The seed of this variety has been distributed to all district gardens.

17. *Sesamum*.—Three varieties of til, *viz*., Dharwar white, Dharwar black and Ahmednagar white, were obtained through the Inspector-General of Agriculture. These varieties, from the analysis of all oil-seeds made last year by the Agricultural Chemist to the Government of India, were found to contain the highest percentages of oil. We had, therefore, sent for them to try them on our farm and see if they continue to yield the same percentage. All of them were sown in the light soil of field No. 4. None of them grew well. The seed obtained from the produce was again sent to the Agricultural Chemist, who found them on analysis to contain a much less percentage of oil than that obtained from the varieties grown in their respective homes. Doctor Leather further says, "These samples are very much inferior to those sent last year."

18. *Paspalum dilatatum*.— This fodder crop has now stood for three years on the same ground. In the rainy season it yielded a crop of good fodder once a fortnight. After the close of this season it ceased to throw a strong head of herbage. In this respect it was just like the local grasses and even worse than some of them. The roots of this crop do not go very deep and therefore in the hot weather it looks very poor. This grass is reported to resist the Australian droughts and to be of such a vigorous habit of growth as to smother other grasses. A letter was therefore written by the Director of Agriculture to the Manager, Wollongarh Experimental Farm, asking him to suggest the cause which prevents the grass from succeeding as well as it does in Australia. The following is the reply of the Manager from which it appears that although the grass is advertised as a drought resister, it is not even capable of resisting an ordinary hot weather here :—"I can understand why the grass has not done so well. We do not experience such dry periods evidently as you do, judging by the large cracks that you say appear in dry weather. *Paspalum dilatatum* certainly won't stand that. It withstands the dry periods we experience in this state, in certain parts, but it is a mistake to think it will withstand even our periods of

drought in some parts. It must have a fair amount of rain, and your rainfall seems abundant, but your soil does not appear from the description to be very good. I would suggest a further trial on some other kind of soil." In accordance with the suggestion of the Manager, some seed has been sent to the Raipur Farm to be tried in matasi and dorsa soil.

19. *Japanese fodder.*—This is a variety of fodder which grows largely in Africa. Mr. Sly had secured some seed from one of his friends. It was grown on the farm on light soil in lines 2 feet apart. The plants grew like our juar in the beginning, but soon after it was found that they have begun to tiller profusely. Each tillered shoot grew as high and as thick as the main shoot; in fact, it was not possible to distinguish the main and tillered shoots. In the end the shoot produced a branch of male flowers at the top and the tassels of female flowers at the sides just like the maize crop. The cobs, however, remained very small. The seed obtained from them are very hard. From the fact of its succeeding so well in light soil, it seems that the variety will form a good addition to our fodder crops. During the current season we are trying it on a better situation.

IV.—ENSILAGE EXPERIMENTS.

20. The system of preserving green fodder was tried in two ways:—

I. The closed above ground silo on the experimental farm was filled as usual in the end of August with chopped juar stalks obtained at the time of thinning, maize stalks, and sorghum cut in green state. It was opened in April last and yielded a nice ensilage which was readily eaten by the farm bullocks. This silo is not quite airtight and therefore naturally a layer about 6 inches on the sides gets spoiled. The Assistant Director of Agriculture thinks of having one made of curved corrugated galvanized iron sheets fixed one above the other up to the height of 16 feet or 20 feet with bolts and nuts and tarred at the air spaces. The form of this proposed silo will be a hollow cylinder about 12 feet wide. The cylinder will rest upon a pucca floor and be supported by 3 or 4 iron rails. The total cost of such a silo will be about Rs. 250. It will, it is hoped, prove a success provided the acids produced during fermentation of the silage material do not corrode the sheets.

II. *The pit silo.*—Three pits 10 feet by 8 feet deep were dug at the breeding farm on the slope of a hillock and filled with coarse green grasses such as Tikhari (*Andropogon Schœnanthus*), kushi, &c. (*Hetropogon contortus*) up to about 1 foot from the surface of the ground, which space was filled up with earth well rammed. The pits were opened in the month of April and excepting a few inches at the top all the stuff was in good condition. The breeding farm cattle liked it very much and it was a great help to them in the hot weather when grazing is very scarce. It should be noted that the kushi grass for ensilage should be cut at that stage when the awns are just about to form; otherwise their presence in the ensilage makes it worthless, because they remain as hard as before and prick the tongue and mouth of cattle, which therefore do not like it so well. Three bundles of this grass were also sent to Pachmarhi for horse fodder. It is now proposed to prepare ensilage at Pachmarhi also which will, it is hoped, yield good supply for horses there in hot weather.

21. The open silo had not been filled up for the last 2 years, partly because we could not get sufficient fodder, and partly because there is a wastage of 1 foot deep all round. This system of cheap silo would suit malguzars who have a large supply of useless coarse grasses.

22. A new trial was made during the year under report of storing the chopped karbi cut at the time of harvest, in a pit dug in the ground. At the time of harvest the inside of the juar stalks are moist and therefore it was thought that this moisture will start fermentation which will soften the hard pieces of juar stalk. In order to induce fermentation sooner some water was also sprinkled over the different layers. Fermentation certainly set in, but it was either too weak or the bits of karbi were too hard to give us the desired result. Moreover, the stuff being very hard it could not be packed as closely as the green juar stalks. Some good karbi was, however, obtained from the bottom portion and was given to the cattle, which seemed to like it, but not so much as they do the ensilage. The experiment was therefore not a complete success. Next season we will give it a further trial by chopping the karbi finer ($\frac{1}{4}$ inch bits) than last year (1 inch bits) and we hope that this finer stuff may press better and give better results.

V.—INVESTIGATION OF PLANT DISEASES.

23. *Smut in juar and wheat*—The treatment of juar seed with a solution of copper sulphate has long been proved to be a most effective remedy against smut. Since the last three years efforts have been made in Nagpur and Wardha to make this remedy known to the people through the Revenue Inspectors. People in these districts have begun to understand about its efficacy and it is hoped that before long it will be in general use. This year the demonstration of copper sulphate treatment have been extended to all the districts of Berar. I myself was the demonstrator in five districts and the people there seemed to

take to it well. I may mention here that the Berar cultivator is more intelligent and enterprising and he is likely to adopt any improvement suggested to him sooner and in a better way than the cultivator elsewhere. The other fungicides (sodium sulphide ½ per cent. solution; potassium sulphide ½ per cent.; copper sulphate ½ per cent. solution and hot water) were tried on both juar and wheat, but as there was no smut on the farm during the year, their efficacy could not be tested.

24. *Wheat rusts.*—During the year under report 116 varieties selected from those grown last year on the farm were sown side by side to see their rust-resisting qualities and to effect such crosses as may possibly turn out to be rust-resistant and have at the same time good milling qualities. Along with these 42 crosses produced on the farm were also grown. The characteristics of all these have been noted and it is being carefully watched as to which will be the most suitable varieties to introduce. The seed obtained from the crosses is not yet quite plump, and it will require 2 or 3 more years to give it the necessary plumpness. For the last six years there has been no rust on the farm crop and in its absence it is impossible to prove the rust-resisting qualities. We, however, by watering the different varieties artificially induced rust conditions; and it appeared on some varieties in the month of February. But by this time all these varieties had already passed the critical stage, as most of the grain had already set in. It is only while the grain is milky that rust damages the wheat crop. Nearly all the crosses grew very luxuriant and tillered profusely.

VI.—TRIAL OF IMPLEMENTS.

25. During the year under report there was no important addition to our stock of implements and machines. A bakhar was obtained from the Hoshangabad District and it was found to work more satisfactorily than the one used in the Nagpur country. It has the following advantages over the Nagpur bakhar:—(1) It goes a little deeper owing to its tines being made of iron. (2) These tines are fixed further apart from each other in the body of the implement and therefore the earth and weeds do not collect between the blade and body so often as they do in the Nagpur bakhar, but pass out backwards over the blade. This saves at least some cleaning of the blade. (3) It has a long body and therefore it is not so apt to give an inexperienced driver a fall. The students of our school will thus find it very convenient; moreover when the blade is cleaned, the weeds and earth sticking to it are thrown off the working furrow and thus do not come in front of the blade and choke it again. (4) There is a saving in ropes. The leather string of the yoke is fixed to a peg in the beam and the implement is ready for work. In the Nagpur bakhar the leather-string has to be joined with another very long and strong rope which goes round the body and the beam separately. (5) The tines being made of iron, there is no fear of their breaking when the implement is at work in the field. This is very important especially when there is no carpenter living near the field.

26. *Platt Brothers' Single roller gin.*—This machine has been obtained at a cost of Rs. 265 through the Manager, Empress Mills.

It was worked on the farm with the bullock gear by two pairs of bullocks. In one day it gins 500 lbs. of seed cotton (kapas). It is on the same principle as the machines used in some ginning factories, but these being worked by steam power they run at a higher speed and therefore a larger percentage of seed is injured. Worked by bullock gear it attains only a moderate speed and the seed remains uninjured and is as good for sowing purposes as that ginned by hand gins. It is worth recommending to cultivators, who produce large quantities of cotton, because at the ginning season they can utilise the labour of their bullocks for this purpose which otherwise remain idle. The whole plant together with the bullock gear costs Rs. 550.

27. In previous years a statement showing the special advantages and the price of the various machines, which have been tried on the farm, formed part of this report. But it has been now decided to print it as a pamphlet for distribution to visitors.

28. In last December at the request of the Chairman of the Bombay Exhibition Committee a set of implements, some seeds and varieties of cotton were sent as exhibits to the Industrial and Agricultural Exhibition held in Bombay last winter. In order to show the working of the several implements (winnower, fodder-cutters bullock-gearseed-drill, cultivator, rake and hoe combined, corn planters, broadcast sower, perfection sprayer, tool grinder, &c.), the overseer of the farm accompanied the implements to Bombay and showed them all at work during the Exhibition. The farm won a gold medal for tools and implements and general excellence. The following is the copy of the certificate sent along with the medal :—

"I do hereby certify that a gold medal has been awarded to the Nagpur Experimental Farm for tools and implements and general excellence at the Bombay Industrial and Agricultural Exhibition of the 20th Indian National Congress, 1904."

VITHALDAS DAMODHAR THACKERSEY,

Chairman, Exhibition Committee.

29. The following statement shows the sale of implements during the year under report :—

VII.—DISTRIBUTION OF IMPLEMENTS.

Names of implements.	Number of implements supplied to		
	District and other Government Officers.	Private persons.	Demonstration and Experimental Farms.
Swedish plough	4	27	...
Turn-wrest plough	4	1	...
Hand thresher	...	2	...
Winnower	4	18	2
Bullock gears...	...	2	1
Smelley cutters	2	8	3
Junior feed cutters	2	8	...
Levell cutters...	1	13	...
Corn sheller	1	9	...
Horse-hoes	...	2	...
Mathew's new universal model combination drills ...	9	...	...
Tattoo marker...	...	1	...
Perfection sprayer	5	7	...
Boring apparatus	...	1	...
Tifans	6	1	...

30. The seeds supplied to District Officers, private persons and Demonstration Farms during the year under report are given in the table below :—

VIII.—DISTRIBUTION OF SEEDS.

Names of seeds.	Quantity supplied to		
	District and other Government Officers.	Private persons.	Demonstration and Experimental Farms.
	lbs.	lbs.	lbs.
Cotton (Jari)	180	241	1,318
Do. (Bani)	100	3	...
Do. (Nimari)	20	1	...
Do. (Upland Georgian)	531	404	...
Do. (Egyptian)	...	15	...
Do. (Chanda jari)	...	...	100
Juar (Ganeri)	5,544	550	650
Do. (Motitura)	1,000	8	600
Do. (Saoner)	1,792	1,087	150
Do. (Ringni)	...	20	200
Paddy (Early)	1,205	1	300
Do. (Chinoor)	540	5	...
Do. (Safeda)	...	...	5
Tur	...	43	75
Bajra (awned)	160	28	...
Sorghum	80	18	...
Maize	66	23	...
Popat	...	...	7
Ambari	...	...	25
Til (Dharwari).	...	...	25
Do. (Winter)	200	16	...
San (Hemp)	...	60	500
Chaoli (Sambalpur)	22	...	...
Ground-nut	189	...	...
Wheat (Haura)	...	120	2,000
Do. (Jondhla)	...	28	...
Do. (Hybrid)	2,300	259	...
Gram	...	100	...
Linseed	...	71	50
Safflower	25	31	400
Peas (country)	409	40	30
Do. (Khaperkhera)	36	4	10

IX.—CATTLE BREEDING FARM.

31. The object of this farm is to improve the breed of Arvi cattle by careful breeding so as to produce good bulls for distribution to cultivators and malguzars. All male stock which is not up to the mark of breeding bulls is castrated and utilized as agricultural bullocks. No attempt is to be made to develop the milking qualities of the breed, because our sole object is to produce good calves which need a full supply of milk.

32. During the year under report no additions were made to the buildings. The tiled shed for the cows and the iron shed with a corrugated iron roof for the bulls provided ample accommodation. The bulls are separated from the cows after they are weaned. This separation is necessary in breeding on systematic lines, especially when the object is to rear bulls suitable for breeding purposes. An intermediate line of fencing separates the grazing area of bulls from that of cows, so that no chance of undesirable bulls mixing with the cows and covering them can occur.

33. The breeding farm still needs another shed to accommodate the female calves after they are weaned. It has been found necessary to keep them separate from the cows and breeding bull because (1) if they are allowed to remain in the herd they continue to suck the mother or even other cows, which therefore remain in poor condition and do not come on heat at the proper period after calving, but take three or four months more. This means a loss to the breeder, whose object is to breed a greater number of animals; (2) the heifers being all along with the bull, are covered at an early age. Nearly all the heifers have been covered at the age of two instead of at three. Covering at such an early age is very detrimental to their future development and results in inferior calves. To remedy this a shed like we have for bulls is proposed. The material for it has already been received.

34. The following statement shows the number of cows, bull calves and cow calves as it stood on the first April 1904-05 :—

Statement.

	No. of cows.	No. of cow calves.	No. of bull calves.
As it stood on the 1st April 1904.	38	16	21
As it stood on the 1st April 1905.	43	31	34

But of 34 bull calves, 25 are being reared separately on the bull-rearing farm and the one which was castrated last year has been brought to the experimental farm.

35. During the year under report there were five deaths in all. One bull calf died of paralysis at the bull farm and four female calves at the breeding farm; two of these died very young and the other two died of pneumonia. In the month of January Colonel Morgan, Inspector-General of the Civil Veterinary Department, paid a visit to this farm. He examined all the stock both at the bull and breeding farms and rejected one bull calf at the former as it was not quite true to type, and 7 cows at the latter. The bull calf rejected by Colonel Morgan has been castrated and four of the rejected cows have been aleady sold for Rs. 105. Colonel Morgan expressed his satisfaction with the general management of the farms, as will be seen from his letter No. 110-C, dated the 30th January, to the Commissioner of Settlements and Agriculture.

* * * *

5. " *Nagpur—Gaolao Cattle.*—This herd is also in a satisfactory condition."

" I would suggest that the following cows be cast and sold at once :"—

" Nos. 7, 11, 13, 21, 25, 28, 34."

" 6. The young bulls coming on are well grown, true to type, and of excellent quality."

* * * *

8. " The progress made by these two farms is most satisfactory and denote the care which has been exercised in the selection of the brood stock and their management."

36. *Feeding.*—The supply of fodder and water has been ample throughout the year. There was sufficiently good grazing along the edge of the tank. The cows were also stall-fed at night with dry grass and a small ration of cotton seed. From the month of February when the green grazing began to diminish they had to be fed on chopped karbi and ensilage, which was of great help in the hot weather. The cows with calves at heel are the first to lose condition and therefore particular care has to be bestowed in feeding them. The

condition of the bull calves at the bull farm has been throughout excellent. They are fed in stalls with cotton seed and other mixed grain, such as ground wheat, juar pulses and linseed. They get on an average 2 lbs. of cotton seed and 2 lbs. of ground grain.

The following figures give the cost of maintaining the farm :—

	Rs.
(1) Salaries	207
(2) Special expenditure	1,524
(3) Ordinary contingencies	994
Total Expenditure ...	2,725

X.—FODDER AND FOREST RESERVES.

37. The Telinkheri and Breeding farms and garden continue to draw their supply of grass from the reserve. About two-thirds of the reserve was utilised as grazing land for cattle of the breeding farm and has been enclosed with wire fencing. The receipts and expenditure of the reserve are as follow :—

Expenditure.

	Rs.
Pay of two Chaukidars	135

Receipts.

(1) Value of grass supplied to garden*	375
(2) Value of grass supplied to Telinkheri and Breeding farms ...	1,000
(3) Value of grass sold to public	182
Total ...	1,557
Deduct cost of Establishment	135
Net profit ...	1,422

* This includes the quantity which is for sale.

XI.—SEWAGE FARM.

38. The season was favourable to the crops of the Kachi cultivators and they have reaped good harvests in both the seasons. The receipts and expenditure of the sewage farm during the year under report are given below :—

	Rs.
Receipts	1,594
Expenditure	824

XII.—FINANCIAL RESULTS.

39. The expenditure and receipts of the year on the farm are shown below :—

	Expenditure.			Receipt.	Net cost.
	Salaries.	Contingencies.	Total.		
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Budget ...	6,636 0 0	4,358 0 0	10,994 0 0	5,000 0 0	5,994 0 0
Actual ...	5,008 12 2	4,100 1 11	9,108 14 1	6,496 4 5	2,612 9 8

A detailed statement showing the various items of receipts and expenditure is printed as Annexure B.

XIII.—TELINKHERI FARM.

40. This farm is used for growing seed for distribution. Safeda, Begma, san and seven other varieties of early paddy from Surat were grown for distribution. But unfortunately the season turned out very unfavourable for paddy. There was no rain at the flowering period, and there being no means of irrigation, all the medium varieties of paddy were a total failure. Whatever seed we had collected during the previous year was lost during the year under

report. It was, however, fortunate that we had also sown the new varieties in small plots on the experimental farm where they could be helped by slight waterings and thus some small quantities of seed were secured. During the current year all these seeds have been handed over to the Raipur Farm. The outturn of the early variety of paddy was also good. It yielded only about 120 lbs. per acre. The other crops did on the other hand fairly well. Hybrid wheat thrived well in the field, which was noted as having been brought under the plough in last year's report.

41. The areas and outturns of the following crops grown on the farm are given in the table below :—

Names of Crops.	Area in acres.	Outturn per acre in lbs.
Cotton (Jari) ...	18·32	253
Juar (Early) ...	12·50	554
Do. (Dharwar) ...	·50	150
Tur ...	5·35	798
Paddy (Early) ...	10·50	117
Til (Rainy) ...	5·10	54
Do. (Winter) ...	2·15	20
Wheat ...	7·15	496
Linseed ...	8·35	274
Gram ...	6·75	164
Peas ...	·90	22
Castor ...	3·95	14
Safflower ...	1·25	445

42. Regarding the Telinkheri Farm, I beg to repeat my remarks made in last year's report, that the frequent changes of overseers are detrimental to its progress: in 12 months four different overseers have been employed. I hope that in future it will be possible to retain the same man in charge of this farm till he gains experience, as we shall always have four probationers under instruction, and these will be available at any time a demand occurs.

The expenditure and receipts of the year under report are shown in the table below :—

	Expenditure.			Receipts.
	Salaries.	Contingencies.	Total.	
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Budget	1,908 0 0	1,792 0 0	3,700 0 0	3,000 0 0
Actual	1,560 15 1	1,786 14 3	3,347 13 4	2,928 4 1

In conclusion, my thanks are due to the Assistant Director of Agriculture who has carefully watched the work of the farm and lent his guidance whenever necessary. I also acknowledge the services of Nandkishore, the overseer of the Experimental Farm, who has continued to work satisfactorily.

LIST OF ANNEXURES.

A.—Statement showing the total areas under cultivation on the Experimental Farm, Nagpur, during 1904-05.

B.—Statement showing the comparison of receipts and expenditure of 1904-05 with that of 1903-04.

Annexure A.

Total Area under Cultivation on the Experimental Farm, Nagpur, during the year 1904-05.

Crops.	Area.	Total.	Grand Total.
	Acres.	Acres.	Acres.
A.—EXPERIMENTAL AREA.			
(1) *Kharif*—			
Cotton alone	2·60		
Cotton and Tur	·60		
Cotton and Juar	·80		
Juar and Tur	1·52	4·92	
(2) *Rabi*—			
Wheat alone	5·89		
Linseed	·29		
Coriander	·29		
Wheat and Gram	·46		
Wheat and Safflower	·46	7·39	12·31
B.—NON-EXPERIMENTAL AREA.			
(1) *Kharif*—			
Cotton (different varieties)	11·36		
Paddy	1·09		
Juar	8·16		
Tur	7·92		
Sorghum	3·07		
San (hemp)	·82		
Maize	·30		
Bajra	·57		
Popat	1·10		
Ground-nut	·67	35·06	
(2) *Rabi*—			
Wheat	2·14		
Linseed	3·60		
Gram	·32		
Til	5·61		
Peas	·74		
Wheat and gram (hirra)	4·52	16·93	51·99
GRAND TOTAL ...	...	...	64·30

Annexure B.

Statement showing the comparison of Receipts and Expenditure of the Experimental Farm, Nagpur, of 1904-05 *with that of* 1903-04.

Heads.	1903-04.	1904-05.	Remarks.
	Rs. a. p.	Rs. a. p.	
Receipts.			
Commercial sale of produce	937 3 6	1,763 0 3	
Distribution { Seeds	901 11 8	994 13 5	
Distribution { Implements	529 8 0	580 2 0	
Rent of Government Land	1,244 10 11	807 4 0	
Sewage Farm	1,593 15 0	1,593 15 0	
Miscellaneous	1,116 2 0	757 1 9	
Total Receipts ...	6,323 3 1	6,496 4 5	
Charges.			
Establishment	4,625 3 10	5,008 12 2	
Travelling allowance	469 1 8	243 13 3	
Supplies and Services.			
Charges for seed-grain	64 6 4	33 3 11	
Farm buildings	0 7 0	1,916 4 6	
Purchase of cattle and implements	104 1 9	16 4 0	Includes Rs. 8-12-0 as cost of two rain-measuring glasses.
Feed and care of cattle	254 8 9	228 14 0	
Variable labour	249 8 0	327 8 10	
Sewage farm	995 7 10	823 10 3	
Other charges	478 7 5	464 2 11	
Contingencies.			
Postage charges	42 14 0	44 10 6	
Telegram charges	3 2 0	0 7 0	
Country stationery	0 14 6	1 2 9	
Total Expenditure ...	7,288 3 1	9,108 14 1	

Report on the Powarkhera (Hoshangabad) Experimental Farm for the year 1904-05.

No. 221, dated Powarkhera, the 18th June 1905.

From—Mr. Jiya Lall Tiwari, Superintendent, Experimental Farm, Powarkhera,

To—The Commissioner of Settlements and Agriculture, Central Provinces, Nagpur.

I have the honour to submit the first Anuual Report on the working of the Experimental Farm, Powarkhera (Hoshangabad District) for the year ending 31st March 1905.

HISTORY OF THE FARM.

2. This farm was established in May 1903, and is situated four miles from Hoshangabad town on the Itarsi Road. It comprises an area of 131·55 acres for cultivation and 182·60 for grazing purposes. The land consists of a black or brown loam containing about 60 per cent. clay and 40 per cent. sand, representing fairly the black soil of the Nerbudda Valley. It slopes from south to north where finally it meets a nala flowing from east to west. Water from the highest portion thus runs along the slope and consequently various small channels are cut. This erosion of water has caused changes in the classification of soil, the highest portion being of a superior quality, to the sloping lower portion.

3. No experiments could be conducted during the year 1903-04, as there was no time to mark out the plots and prepare the land for experiments. Ordinary sowings were therefore undertaken.

4. Experiments have been commenced during the year under report. But in bringing the land under experimental cultivation many old field margins were broken and the higher lying portions levelled off; thus the quality of the soil varies in many of the fields owing to the presence of the patches of what is virtually virgin soil. The position of some plots is also uneven.

CHARACTER OF THE SEASON.

5. The monsoon set in very late, in the end of the third week of June, commencing from the 20th with a shower of 1·10 inches and followed by light showers for four days. The total rainfall of the year amounts to 26·38 as per table given below.

Month.	No. of rainy days.	Rainfall.	Month.	No of rainy days.	Rainfall.
			Total brought forward ...	37	26·08
April ... First half ...	...	...	October ... First half ...	...	...
April ... Second half ...	...	...	October ... Second half ...	...	·06
May ... First half ...	...	...	November ... First half ...	...	...
May ... Second half ...	...	...	November ... Second half ...	...	...
June ... First half ...	...	...	December ... First half ...	...	...
June ... Second half ...	3	1·67	December ... Second half ...	1	·24
July ... First half ...	8	6·26	January ... First half ...	...	...
July ... Second half ...	6	4·40	January ... Second half ...	...	...
August ... First half ...	8	5·65	February ... First half ...	...	...
August ... Second half ...	4	0·59	February ... Second half ...	...	...
September ... First half ...	6	5·36	March ... First half ...	...	...
September ... Second half ...	2	2·15	March ... Second half ...	...	...
Total carried over ...	37	26·08	Grand Total ...	38	26·38

Note.—A rainy day is taken as one on which there was a fall of not less than 10 cents.

6. The total rainfall during June was only 1·67 inches and no sowing of kharif crop could be done on account of the soil not being thoroughly saturated. Though the land was properly prepared for sowing, yet the soil was scarified, once more, to kill the weeds.

7. There was a break from the 25th to 30th of June, but some light showers fell during the first week of July amounting to 2·10 inches, which facilitated sowing.

8. There was a fall of 4·73 inches during the four days after sowing which was harmful. The six days' break after 10th (excepting a light shower of ·25 inches on the 13th) repaired the damage so caused. The total rainfall during the month of July was 10·66 inches. The necessary weedings and hoeings were done and all the crops were in good condition by the end of September.

9. Rice did farly well up to the end of August and weeding was completed, but no *biasi* or transplantation could be done on account of insufficient rain and the plants began to wither in consequence. The crop had entirely withered by the end of September. All the plots were bakhered up and rabi crops were then sown according to the scheme under report.

10. Juar was affected by borers in patches; cotton was all right up to the 25th of September, but afterwards it was injured by the strong sun of the latter part of September and whole of October.

11. The weather was cloudy and hot without rain during October, the sowing of rabi crops was finished by the third week. Germination was uneven on soil:—

(i) which had been scoured by rain;

(ii) whence the surface soil had been removed down to about 2 feet deep for the purpose of making field banks or levelling surface inequalities.

12. All the crops were in good condition up to the middle of February when the frost killed the entire crop of ringni juar, Chanda cold-weather cotton (which was in flower) and jari cotton (from which three pickings had been taken), while other crops sustained partial damage.

13. A number of series experiments were started in various plots, of which the following yielded interesting results, though no general deductions can be drawn from the outturns of a single year.

SERIES A. AND B. SUBJECT.—*Effect on wheat grown continuously of different kinds of manure with and without irrigation.*

Here the results of green soiling with san hemp and tarota weed (*cassia tora*) were noticeably good. Owing to the well not being ready, irrigation was not possible.

SERIES J. AND K. SUBJECT.—*Effect of embanked fields on wheat grown continuously with different manure and in rotation with other rabi crops.*

Here the embanked fields in a dry year exhibited a marked superiority to other series in unembanked field.

SERIES Q. SUBJECT.—*Experiments in Kans eradication.*

No. of plot.	Area.	Crops.	Outturn. Grain.	Other.
1.	1·00 ...	Gram. ...Special treatment. Ploughed once with Swedish plough and bakhared twice ...	239	292
2.	Do. ...	Do. ...Ploughed with Batchelor plough, then by Swedish plough, and bakhared 4 times ...	301	344
3.	Do. ...	Do. ...Ploughed by Batchelor plough and bakhared twice	381	398
4.	Do. ...	Do. ...Ploughed by country plough and bakhared twice ...	258	312

The result of this experiment which was conducted in land thickly infested with kans (*Saccharum spontaneum*) and fallow for some years was greatly in favour of the Batchelor plough.

GENERAL.

14. Wheat, Jalalia, the local variety, Jari cotton, juar, motichura, early varieties of rice and tur received from Nagpur were sown in various experimental fields during the year under report.

15. The work of constructing the two wells, undertaken by the Public Works Department, was commenced as soon as the farm was established, but they were not ready for irrigating the experimental series of wheat crops.

16. Embanked fields have given a superior outturn, the average being twice the unembanked plots. It shows that the embanked fields can give a handsome outturn, even in a year when rainfall is below the average as they retain moisture for the crops.

17. The total loss from inadequate rain is cent. per cent. in the case of rice from rain and frost 20 per cent. to all kharif crops and 20 per cent. to 30 per cent. to all rabi crops.

18. It is a fair conclusion from the above results that unembanked land requires at least one or two showers of rain between October to December to assist the crops to attain their full growth and mature properly.

19. Also it is noteworthy that the patches from which soil was dug away for the purpose of levelling or where ditches had to be made to supply earth for embankments of fields, did not produce successful crops and the fields, which were sown in cloudy weather, did not do so well as those sown in fair weather.

20. Finally, I beg to state that the surface was uneven and there were many ditches which had to be filled and levelled. It has now been decided, once for all, to level each plot separately and not to allow the surface soil to be washed away by rain so as to vitiate the experiments.

DISTRIBUTION OF SEED GRAIN.

21. The following seed grains were distributed to the gentlemen named below :—

Names.	Wheat, hybrid.	Gram.	Cotton seed.	Tur, Nagpuri.	Juar.	Ambadi.	Castor.	Tur (Hoshangabad).
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
For distribution—								
The Depty Commissioner, Jubbulpore	250	...	...	...	...	...	...	...
The Manager, Jammalhi Estate, Chhindwara District ...	1600	800	...	...	...	...	...	...
For trial—								
Mr. G. E. Clark, of Seoni-Malwa	20	...	...	...	...	...	...	...
Dharamchand, tenant of Chontala, Seoni Tahsil ...	...	...	80	...	...	...	...	...
Seth Alli Bhoy, of Hoshangabad	...	...	4	10	8	...	...	...
Gopal, Malguzar of Powarkhera	...	...	...	20	16	...	...	...
Onkar, Malguzar of Pathori ...	...	...	8	...	...	...	...	...
Ramlal, tenant of Koolamri ...	...	...	24	...	...	...	...	...
Guttu, tenant of Powarkhera ..	...	...	4	10	44½	2	4½	10
Baliram, do. do. ...	...	...	8	...	...	...	...	...
Gulab, do. do. ...	...	...	4	5	...	...	...	...
Ramia, do. do. ...	...	...	...	2½	2	...	...	...
Ganesh, do. do. ...	...	...	...	...	...	...	...	10
Tullu, do. do. ...	...	...	...	—	...	...	...	5
Ramdin, do. do. ...	...	...	...	...	...	...	...	5

22. I am glad to note that Dharamchand has adopted the improved method of sowing crops in lines and the use of the bullock hoe (Daura and Dundia) for weeding.

He had sown the cotton seed given to him in two ways on morand soil:—

(i) Nearly five acres of land was sown with the tube drill attached by a rope to the bakhar at the rate of 10 lbs. of seed per acre. The crop was first hand-weeded when young and then bullock hoes (Daura and Dundia) were used twice. The expenses incurred in weeding the crop amounted to Re. 0-14-5 for an acre and the outturn was 4½ maunds per acre.

(ii) An area of nearly 2·50 acres was under broadcast crop which was hand-weeded three times and the charges come to Re. 1-3-9 for an acre. The seed was sown at 8 lbs. and the outturn was 2 maunds only for an acre.

The cultivator admits that to adopt the former method is profitable and states that in both of the cases the cotton was good in quality. The cotton seed is superior to the local variety and the same is the case with the lint. Hence, a good price is fetched for this crop.

The other cultivators of the neighbouring villages have tried the seeds and appreciate the tur mostly, it being an early variety, not affected by frost.

MACHINERY AND IMPLEMENTS.

23. Five winnowing machines (Harder's farming mill) have been sold to the following gentlemen of the Hoshangabad district through this farm and there is still a demand for more machines:—

1. R. S. Nirbhesing Mandlo of Shohpur.
2. Mr. G. E. Clark of Seoni-Malwa.
3. „ Balwant Rao Bhide of Khaperkhera.
4. Pandit Chandramull Sital Prasad of Takhu.
5. The Assistant Manager, Court of Wards, Bankheri.

One tifan (three-tinned seed drill) complete was also supplied to Mr. G. E. Clark of Seoni-Malwa.

FINANCIAL RESULTS.

24. The expenditure and the receipts of the year are shown below:—

	Expenditure.			Receipts.	Net cost.
	Establishment.	Contingencies.	Total.		
	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
Budget	3,684 0 0	3,388 0 0	7,072 0 0	...	7,072 0 0
Actual	2,160 0 6	3,202 8 8	5,362 9 2	1,359 12 4	4,002 12 10

CATTLE BREEDING FARM.

25. A breeding farm is attached to the Experimental Farm consisting of an area of 182·60 acres as already stated in paragraph 2 of this report, and it is in this area that the farm quarters and other sheds have been erected.

26. This farm was started in July 1903 with five cows and a further purchase of 21 cows (with one female and three male calves at foot), 2 bull calves and 1 bull in December 1903. The cattle belong to the Malwa breed.

27. The following table shows the increase in the herd up to the 31st of March 1905:—

	Bulls.	Bull calves.	Cows.	Calves (at foot.)		Total.
				Male.	Female.	
First purchase (July 1903)	...	...	5	...	...	5
Second purchase (December 1903)	1	2	21	3	1	28
Total A ...	1	2	26	3	1	33
Births at the farm during 1903-04	...	...	...	6	3	9
Do. do. 1904-05	...	...	...	15	6	21
Total B ...	...	...	...	21	9	30
Grand Total (A+B) ...	1	2	26	24	10	63
Deaths during 1903-04	...	...	...	1	...	1
Do. do. 1904-05	...	...	1	1	...	2
Total (C) ...	...	...	1	2	...	3
Number in stock on 31st March 1905 (A+B—C.) ...	1	2	25	22	10	60

28. Bull calves as soon as they attain the age of 9 months are separated from the general herd and grazed apart. To secure this fully, a separate shed has been erected for them. The number of such calves on the 31st of March 1905 was eleven.

29. The cattle were healthy during the year under report. There was no outbreak of contagious or other disease. Fodder was ample throughout the year. A nala runs through the breeding farm area (Bir land) and provides the cattle with a sufficient supply of drinking water up to March, after which it dries up. The cattle are therefore supplied with water from the wells during the hot season (April to July).

30. No cattle were sold during the year under report. The Inspector-General of the Civil Veterinary Department inspected the farm in January last and found six cows, one male and one female calf, not true to type and rejected them. But they could not be disposed of before the close of the year as orders relating to their sale were received very late.

31. The expenses incurred in the maintenance of this farm (cattle breeding) during the year under report amounts to Rs. 1,562-9-8 as detailed below:—

Establishment. Pay of graziers.	Feed and care of cattle.	Farm buildings.	Total.
Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
49 6 3	168 6 3	1,344 13 2	1,562 9 8

Annexure A.

Total Area under Cultivation on the Experimental Farm, Powarkhera (Hoshangabad District) during the year 1904-05.

Crops.	Area.	Total.	Grand Total.
A.—EXPERIMENTAL AREA.	Acres.	Acres.	Acres.
(1) *Kharif*—			
Cotton alone	3·00		
Cotton and tur	·60		
Cotton and juar	1·00		
Tur and juar	·80		
Tur alone	·20	5·60	
(2) *Rabi*—			
Wheat	18·70		
Wheat and gram	1·00		
Wheat and kardi	·20		
Wheat, gram and linseed	·20		
Gram	5·60		
Linseed	3·20		
Teora	2·40		
Rabi til	·40		
Coriander	·20	31·90	37·50
B.—NON-EXPERIMENTAL AREA.			
(i) *Kharif*—			
Cotton and juar	4·00		
Juar alone	3·94		
Juar and popat	4·44		
Tur and ambadi	18·94		
Rainy season tilli	·40		
San hemp	1·50		
Sorghum Collier and juar	3·55		
Bilaspur tur, Surat beans and cotton	·50	37·27	
(ii) *Rabi*—			
Wheat (haura)	1·00		
Wheat (hybrid)	7·88		
Wheat (jalalia)	2·40		
Wheat (pissi)	2·00		
Wheat and gram	4·73		
Gram	6·50		
Linseed	2·20		
Oats	·40		
Masur	·50		
Peas	·40		
Kardi	1·32		
Chanda cold-weather cotton	1·00		
Ringni juar	5·05		
Rabi til	1·50		
Rabi til and Hoshangabad tur	3·50	40·38	77·65
Total area under cultivation (Experimental and Non-Experimental)			115·15

Report on the Labhandih (Raipur) Experimental Farm for the year 1904-05.

No. 170, dated Labhandih, the 31st July 1905.

FROM—Mr. TUNDILAL POWAR, B. A., Superintendent, Experimental Farm, Labhandih (Raipur),

To—The Director of Agriculture, Central Provinces and Berar (through the Assistant Director Central Provinces).

I have the honour to submit herewith the annual report for the year ending on the 31st March 1905, on the working of the Experimental Farm at Labhandih (Raipur).

I.—CHARACTER OF THE SEASON.

The following Table shows the rainfall of the year under report as registered on this Farm:—

Month.	Number of rainy days.	Rainfall.
		Inches.
April	...	...
May	...	...
June *	8	4·29
July	14	7·29
August	13	12·31
September	9	3·06
October	4	5·17
November	...	...
December	...	...
January	4	·88
February	3	1·00
March	1	·35

* The raingauge was set up on 7th June.

The monsoon broke in the beginning of June. Sowing was completed in time and germination too was successful, with the exception of a few plots of cotton where the seed failed to germinate and which were resown. But owing to the water-logged situation of the plots, the incessant heavy showers of rain in the beginning of the season damaged juar and cotton severely and these crops made no progress till the middle of August. The breaks in the rains during the months of September and October did great good to these crops.

The season at the commencement was favourable for rice. Transplanation and *biasi* were properly done. But the break in the months of September and October injured the crop, especially the unirrigated ones, when they were in flower.

The light showers of rain during the month of January benefited the rabi crops.

II.—RESULTS OF THE SEVERAL SERIES OF EXPERIMENTS.

2. A set of series experiments were started at the Farm this year, of which the following afforded interesting results.

SERIES A. SUBJECT.—*The effects of different methods of sowing rice without irrigation.*

Here transplantation was easily the most successful, *biasi*, *lehi* (or previous germination) and unoperated cultivation following in the above order. Owing to percolation from the neighbouring irrigated fields, the comparison between this and the next series was vitiated.

SEIRES B. SUBJECT.—*Same as A with irrigation.*

The results of the different methods were the same as in the case of A.

SERIES C. SUBJECT.—*The effect of different manures without irrigation upon transplanted rice.*

Poudrette and bone-dust here gave the best results.

SERIES D. SUBJECT.—*To test the effects of double cropping after rice.*

The dry season greatly obscured the results of this experiment, which went to show that linseed is the only crop that did better when sown in utera than when the ground is ploughed up after cutting the rice and the second crop drilled in.

Generally speaking, the fact that the series has only just begun and that the farm land has not yet been evenly prepared render it impossible as yet to draw any general conclusion from these experiments.

III.—VARIETIES OF CROPS.

Popat.—This is quite a new crop in this part of the Province. It was sown both on field embankment and as a dry field crop. In each case it has done well and given exceptionally good outturns, showing that the soil and climate are well suited to it. A good deal of seed has been distributed amongst the cultivators who have shown a liking for this crop as it grows without much trouble and fetches a good price as a vegetable.

Sorghum.—This was sown as a fodder crop. It grew luxuriantly and supplied excellent fodder for the cattle.

Dhan.—Along with different local varieties, *safeda,* a punjab variety, received through the Assistant Director of Agriculture, Central Provinces and Berar, was tried here. It was transplanted and came to maturity in about four months. As the quantity of the seed sown was small, no idea can be formed of the outturn as well as of the quality of the grain.

IV.—GENERAL.

Some time was devoted to clearing waste land of trees, &c., and ploughing it with the Turn-wrest plough. About 40 acres of new land have been brought under cultivation and will be sown, some with kharif and the rest with rabi crops, in the coming year.

At the time of building the Farm quarters no arrangements were made for the lodging of the Farm Clerk, who experienced great difficulty in securing a suitable place to live in, in the adjoining village. Therefore it was thought desirable to build quarters for him also. The work was undertaken departmentally and a clerk's quarters with tile roofs and six rooms for the ploughmen with corrugated iron roofs, were built with mud walls based on a pucca foundation.

In conclusion my thanks are due to the Assistant Director of Agriculture, Central Provinces, who frequently visited and watched the work of the farm and gave me all necessary instructions.

I also acknowledge the services of the Farm Overseer and the Clerk, both of whom have discharged their duties satisfactorily.

V.—FINANCIAL RESULTS.

The expenditure and receipts for the year under report are as under:—

	Expenditure.			Receipts.	Net cost.
	Salaries.	Contingencies.	Total.		
	Rs.	Rs.	Rs.	Rs. a. p.	Rs. a. p.
Budget, 1904-05 ...	3,684	1,650	5,434	.....	.....
Actual, 1904-05 ...	2,261	1,650	3,911	798 6 2	3,112 8 10

LIST OF ANNEXURES.

A.—Statement showing the Expenditure and Receipt of the Experimental Farm, Labhandih.

B.—Distribution of Implements.

C.—Statement showing the total area under cultivation on the Experimental Farm, Labhandih, during 1904-05.

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Hemendra Kothari

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Nagpur Experimental Farm.

Report on the working of Nagpur Experimental Farm for the years 1890-91, 1891.

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